Chances of Inserting the Renewable Energy Material into the Junior High School Curriculum

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Chances of Inserting the Renewable Energy Material into the Junior High School Curriculum

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Abstract

One of the programs developed by the Ministry of Research and Technology in its white book, 2010-2025 is renewable energy. This program has not become an important learning material at school. The 2013 curriculum containing the concept of energy is more directed into what energy is, how energy changes and where the sources of energy are from. This paper describes the chances of the renewable energy are taught to Junior High School Students. Sources of simple renewable energy should also taught early. No specific subject matter is intended to discuss renewable energy. Therefore, one of the important studies is how to include the renewable energy material into the Junior High School curriculum, specifically, how the material may be included into skill subject matters. It is expected that the materials on renewable energy taught will not merely include theories but also simple practices.

Keywords: renewable energy, curriculum, energy change

INTRODUCTION

Fossil energy sources are decreasing in quantity and this condition has attracted a great attention from various countries. The quantity of non-renewable energy is limited, and moreover it may also give effects on destroying the earth when it is being explored (Ministry of Domestic Affairs). This condition makes a lot of countries aware of the importance to create and make use of renewable energy. Even up to 2020, various European countries will have been improving the efficiency in using the renewable energy up to 20% ((ESEC & European Renewable Energy Council, 2008).

In general, in nature renewable energy and not well-explored sources are available. Indonesia is a country in which the equator line passes through and which is well known for its overflow natural resources. However, the natural resources are not well managed and made use of. Therefore, one of the focuses of the Ministry of Research and Technology up to year of 2025 is the creation and the use of new and renewable energy sources.

As expressed in the Newspaper *Republika* on August 12, 2014, that at least there are ten resources in Indonesia that may be made use of as renewable energy sources namely the sun, the sea, the wind, geothermal, hydropower, hydrogen, bio-ethanol, coal, and biomass. One of the researches made by Heyko (2016) reveals that to save fossil energy, the use of renewable energy in the form of bio-diesel and bio-gas is far more efficient and beneficial. Less-ready human resources result in less optimal ways in making use of the existing natural resources. Therefore, the Ministry of Research and Technology has made long term program (up the year of 2025) on the creation and the use of renewable energy. What is important to support the program is to give some understanding and knowledge to young generation dealing with the natural condition in Indonesia and the importance of alternative energy as the substitution of the energy that has been being used so far.

Cholily et al (2016) reveals that school is a strategic and formal place to implant the understanding of the importance of renewable energy. Through the existing learning activities, behaviors and knowledge on the renewable energy may be implanted. It is through this way that some awareness and concern and understanding of the importance of renewable energy may be grown early. In line with the students' cognitive development level, these may be presented to the students at the Junior High School level.

The Material on energy in Junior High School is contained in the subject matter of Natural Sciences. But, the material leads to the concept of what energy and types of energy. The discussion of the material is still focused on students' understanding leading to their cognitive competence. It is because the teachers still refer to the attainment of the competence stated by the government in the curriculum. Teachers' bravery in creating without neglecting what has been determined in the curriculum should be given a special attention and also accompaniment (Cholily, 2015).

Loading the material of renewable energy into the curriculum in Junior High School has not been explicitly made. Remembering the challenges in the future, it is necessary to think of loading the material in the curriculum. This short article is trying to stimulate the world of education to start viewing that the matter of renewable energy should be included into the curriculums in various fields of sciences.

REVIEW OF LITERATURE

Curriculum of Junior High School

School s a strategic place for learning so that students possess intended behaviors, including knowledge and understanding to

improve their own awareness of and concern with the use of renewable energy sources. This learning should be implemented in accordance with students' cognitive level namely since they are in Junior High School. Sanjaya (2008) stated that first, curriculum was viewed as a collection of subject matters that should be learned by students. This opinion step by step was also shifted and started containing students' learning experiences (Sukmadinata, 2008). To attain the goal, the Junior High School curriculum should be designed and organized by enriching the content of renewable energy.

Conceptually, curriculum is a response of education to the community's and nation's needs in building the young generation of the nation (Udelhofen, 2005). Pedagogically, McNeil (2006) stated that curriculum is an educational design that gives chances to the students to develop their potential in a condition which is comfortable and appropriate with their abilities to have qualities intended by their community and nation. Juridically, curriculum is a public policy which is based on the basic philosophy of a nation and a juridical decision in the field of education.

The material of energy in the 2013 curriculum is partly discussed in the Natural Science subject matter but even the renewable energy is not explained in detail, since the Natural Science should also discuss biology and chemistry (Regulation of the Minister of Education and Culture Number 68 year of 2013). The development of Basic Competence (BC) will also give impacts on the development of teaching materials. Therefore, the Junior High School curriculum should be well organized to avoid any overload and overlap of teaching materials. The two problems should be paid attention, as reminded by Darling (2005) that the main problem in developing a curriculum is content and coherence, especially the scope and sequence. Nasution (2006) also confirms that the curriculum organization with the basic concept of meaningful learning will help and facilitate teachers and students to reach the goal of the curriculum.

Renewable Energy Sources in Indonesia

Indonesia has determined the target of the use of renewable energy in 2025 of 23to fulfill the increasing demand for energy (IRENA, 2017). Actually renewable energy has been made use of since thousands years ago. Firewood is one of the forms of biomass (organic materials and may become the source of energy) which has been made use of to cook foods and also for steam engine train. It is a renewable energy source since trees may always be planted again.

It cannot be denied that the need for energy is increasing from time to time, while the reserve of the energy resources from the nature are becoming less and less. The making of energy sources from the nature needs a very long time so that it is predicted that in a point of time in the future the energy from the nature will be depleted (Simanjutak, 2005).

In general, there are many energy resources in daily life. The energy resources may be classified into renewable and non-renewable energy. Fuel oil is an example of a simple energy that is non-renewable. This kind of energy tends to be taken from the nature in the limited amount. The formation of this energy needs millions of years from the natural condition (Robert Ferry & Elizabeth Monoian, 2012). Since the condition of the energy reserve is very limited, it is necessary to look for renewable energy resources.

Now it can be stated that renewable energy resources are the cleanest energy resources available in the nature. It has been explained in the Guide book of PNPM Mandiri (the National Program for Community Empowerment) that renewable energy is energy resources that may deplete naturally but may be formed from the natural elements available in the earth in a very great amount. Some of the energies are the sun, the wind, the waves, plants and the like.

In general, there are many renewable resources in Indonesia that have not been well handled yet. it is because the knowledge of Indonesian people about the renewable energy is still low or their understanding of the renewable energy has not been well implanted. So, it is necessary for the community to know what renewable energy is and how to create it, and it should be given an emphasis in the field of education and be confirmed well in the national curriculum.

There are many natural potencies in Indonesia that have not been well exploited to become an energy (Frankfurt School and UNEP, 2016). The potencies among others are the wind power, hydropower, geothermal or biomass, all of which have not been utilized well. Each areas has different potencies so that it is necessary to map the local potency. It may be utilized to make a proper choice of the renewable energy resource in each area. It has been implemented in some developed countries (Kandpal & Broman, 2014)

RESEARCH METHOD

A qualitative approach is employed in this present research, and the subjects were teachers in Junior High Schools in Malang city. The data were obtained through documents, interviews and Focus Group Discussion (FGD). The document data studied deal with the curriculum implemented in Junior High School in terms of skills to be mastered by students. Then interviews were made with the teachers teaching Mathematics and Natural Sciences. The data were perfected through FGD attended by 30 teachers of Junior High School. The data were analysed u by describing the obtained data.

RESULTS

Renewable energy should be introduced to children early. The need for educating and training the renewable energy at all educational levels is recognized globally. For the last three

years, big countries have launched academic programs of renewable energy technology and the related aspects intended to raise an awareness of the importance of renewable energy. Moreover, creativity to change or to create energy resources should also be grown in the mind of the children. In order to have a legal power, it is necessary to include the material intro the prevailing curriculum namely the 2013 curriculum.

Inserting the competence of renewable curriculum into subject maters under the category A, the main materials, needs a stronger government policy since it should change competencies that have been determined by previous experts. But there are still some chances and tey are more easily implemented when the competence of the renewable energy is inserted into *prakarya* (craft) subject matter.

Based on the document data dealing with the curriculum, up to now the books on *prakarya* subject matter that has been prepared by the government are the one for Grade VII, but no books on the subject for Grade VII and Grade IX have been available. It is through this subject matter various competences, either cognitive, affective or psychomotor, that should be possessed by students may be combined. It is confirmed from the results of FGD that the renewable energy in the *prakarya* subject matter is not found in the curriculum.

Content Standard (CS) is one of the very important parts in the curriculum implementation. It is due to the fact that Content Standard is a minimum measure that should be attained by students dealing with either th competence or material. CS is made by the central government, namely, NAPC (National Agency for Professional Certification or BNSP), after the approval from the Minister of National Education in the form of regulation of the Ministry of National Education.

CS is arranged in the form of Core Competence and Basic Competence. The arrangement is the minimum framework which is still a basic concept that becomes the reference in the development. It is expected that the educators or educational staffs should possess the competence of developing the CS professionally. The development of CS professionally by the teachers and educational staffs is really needed by each level of education unit, since it is through the way that an education unit may make and reach its vision, missions and goals.

CS is developed from Core Competence into some related elements and each element is discussed in detail to reach a competence which is in line with the competence itself. It should be implemented well and rightly, so that it may be used as the material in making syllabus and lesson plan.

The development of Content Standard is made through various elements namely: a) material derivative; b) attainment indicators; c) students' capability; d) learning method, and e) learning media, time and evaluation.

CONCLUSION

Prakarya subject matter as part of the development of students' skills has not been studied in terms of new and renewable energy. Therefore, it is necessary to develop a curriculum and Content Standard that cover Core Competence and Basic Competence.

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